

MISSION NEED STATEMENT (MNS)  
FOR THE  
JOINT TACTICAL RADIO (JTR)  
21 August 1997

1. Defense Planning Guidance (DPG) Element. This MNS responds to fiscal years 1996-2003 DPG for Command, Control, Communications, Computers and Intelligence (C4I). It directs CJCS and the Services to provide the Deputy Secretary of Defense with a plan to define DoD-wide requirements and to consolidate service programs into an interoperable, joint program for the development and acquisition of affordable, high-capacity tactical radios to meet the bandwidth needs of various echelons. This will consist of using a family of digital, modular, software-programmable radios, ranging from a low-cost joint tactical digital radio to a higher-capability, joint multi-band, multi-mode radio to provide timely dissemination of battlespace command and control, intelligence, air navigation, and combat identification information to the warfighter at all levels.

2. Mission and Threat Analysis.

a. Mission.

(1) A smaller military with global responsibilities will operate across the operational continuum to protect our national interests. We must be prepared to project overwhelming combat power from the Continental United States (CONUS) and forward from the sea in response to crises or other global requirements. The success of joint and combined military operations will depend on the rapid exchange of information throughout a highly mobile and dynamic combat environment, *both with other elements of our joint or coalition forces and with civil and national authorities.*

(2) Existing tactical communications systems generally employ 1960's, 1970's and 1980's technology and are singular in function. Timeliness and volume requirements for data distribution are rapidly outpacing the capabilities of single-channel radios and other communications systems. The singular functionality of current systems requires a commensurate number of unique discrete radio systems that must each have a costly logistics infrastructure. The single function hardware design of existing legacy communication systems also often cannot take advantage of rapid changes in commercial technology, and therefore cannot provide the increased functionality and flexibility that is possible and required. Even with the possible technical improvements to existing legacy systems, those changes could not compare to the advantages of a consolidated systems approach to provide substantial benefits in the overall space, weight, power and cost. Therefore, the need is for a software programmable and hardware configurable digital radio system that provides increased interoperability, flexibility and adaptability to support the varied mission requirements of the warfighters. The system must be capable of simultaneous networked voice, video, and data operations with low probability of intercept over multiple frequency bands.

(3) The military must migrate toward commonality of media among users while concurrently out-pacing the growth rate of information exchange requirements. The concept behind JTR is essential to realizing our goal of a fully digitized battlespace.

JTR lays the foundation for achieving network connectivity across the RF spectrum . The network will provide the means for low to high rate digital information exchanges both vertically and horizontally between warfighting elements and will enable connectivity to civil and national authorities.

b. Threat Analysis. Threats to the communications capabilities of our future warfighters will employ a range of technologies from simple commercial electronic devices to advanced state-of-the-art systems. JTR will specifically be subjected to a wide variety of threats including electronic support (intercept, identification and location), electronic attack (jamming and anti-radiation weapons), and modern information warfare techniques. The intent is for JTR to be employed by a wide range of weapons platforms and command and control nodes , at all echelons. Therefore JTR will be subject to the full spectrum of physical attack, to include direct and indirect fires, nuclear biological chemical (NBC) munitions, air strikes, and sabotage and terrorist actions.

c. Priority. Information Warfare and the migration toward a fully digitized battlespace make the concept of the JTR essential to future military communications. This makes JTR a top priority within the communications mission area.

d. Operational Need. Our future warfighter needs an enhanced integrated battlespace communication capability compatible with existing service communications and network systems.

#### General

Easy to operate, redundant, secure, networked, demand adaptive and more survivable than the current generation of analog radios and stovepipe networks.

#### Radio

Multi-mode; multi-band; open architecture; digital interface and control; software reprogrammable; modular (hardware and software); scaleable and flexible form factor; frequency agile/demand adaptive; compatible with existing service communication systems; integrated software reprogrammable crypto/infosec.

#### Network

Defense Information Infrastructure Common Operating Environment compliant; provide remote control and networking capabilities using industry-standard interfaces and open-systems protocols.

The system will be employed and operated in several environments. This necessitates a need for a family of systems that can be deployed from an extremely hostile to a benign environment worldwide and in all services. To respond to variations in operating ranges and conditions, the system will need to operate over multiple frequency bands and with a variety of waveforms. The JTR must be capable of providing short- to long-range, both terrestrial and satellite communication, information exchanges (voice, video and data), with enough capacity for much higher data rates than available with current equipment. In addition to low and medium-rate data exchanges, the system must accommodate continuous high speed data linkages

through dynamic allocation of the resources. For backward compatibility with legacy communications systems, it must be able to interoperate with our current battlespace communications systems, as well as, other emerging military and commercial communications technology.

e. Timing of Need. Elements of JTR must be pursued and acquired and fielded as quickly as technology permits in order to realize the digital battlefield at the turn of the century, as well as, replace aging costly and maintenance intensive legacy systems and their infrastructures.

f. Systems in the current generation of communications systems exhibit one or more of the following shortfalls Existing systems were designed to satisfy specific requirements. As such they satisfy some, but not all, of the needs of the CINCs and joint services. Specific deficiencies of current systems include:

(1) restricted to low-to-medium speed data transmission, routing, and networks.

(2) operate on a single frequency band and are limited to a single waveform. They can inter-operate only with like radios, mandating multiple radios for most weapons platforms and command and control nodes.

(3) require complex network management schemes, and extensive individual training, for operating architectures composed of different radios.

(4) cannot automatically adjust performance (bandwidth and power) to meet demand. Fixed data rate channels waste capacity when it's not needed, and cannot provide higher capacity when the demand exists.

(5) have numerous system unique components and parts, requiring individual support creating a logistics burden.

(6) are not capable of simultaneous voice, video and data operations.

(7) do not employ open systems architecture standards.

(8) few are inter-Service interoperable.

(9) require extensive equipment and/or software changes to implement new capabilities in installed platforms.

(10) do not allow incremental upgrades of software and hardware to increase operations capability.

(11) represent outdated technology based on non-modular design and are not conducive to cost effective improvement or modification to satisfy current, projected or future interoperability requirements.

(12) require extensive, depot level, equipment and/or component changes to implement new capabilities in installed platforms. The JTR will provide the operational forces with an upgraded communications capability, for more effective battlespace management and interoperability among Command, Control, Communications, Computers and Intelligence (C4I) systems.

3. Nonmaterial Alternatives. There are no operational concepts, tactics, or changes in organization or training that can be implemented to overcome these deficiencies.

4. Potential Material Alternatives. Speakeasy was an ARPA-sponsored, Air Force-led, joint technological development effort which produced a useable systems architecture and demonstrated software reprogrammable, multi-band, multi-mode communications capabilities at the Army Task Force XXI, Advanced Warfighting Experiment in March 1997 Identification Communication Navigation Integrated Avionics (ICNIA) and the Joint Combat Information Terminal (JCIT) are related efforts oriented toward developing a multi-band, multi-mode capability to integrate legacy radios for air platforms. The Army's Near Term Digital Radio (NTDR) program is designed to procure and test a low-cost networked data radio capable of providing own position location and transporting command and control as well as situation awareness information between tactical operations centers. The Army led Joint Tactical Terminal (JTT) program is a effort to procure an open system architecture terminal to support the Integrated Broadcast System (IBS). The Joint Maritime Communications System (JMCOMS) program is a Navy-led acquisition program to acquire Commercial Off-the-Shelf/Non-Developmental Item (COTS/NDI) modular programmable radios (Digital Modular Radio (DMR) and Integrated Terminals Program (ITP) and integrated, automated network management (Automated Digital Networking System (ADNS)).

5. Constraints.

a. Environment. The JTR must operate in all wartime and contingency operations, as well as worldwide conditions on land, sea, and air. However, protection afforded normal commercial-off-the-shelf equipment may be sufficient depending on the platform housing the hardware.

b. Mobility/Transportation. The JTR will be deployed on multiple service platforms across the operational continuum. Hardware size and weight must not exceed the characteristics of current radios in use and will permit the consolidation of the many individual functions.

c. Logistics. The JTR must be inherently reliable, maintainable, and deployable in order to minimize life cycle support costs. It will be supported within the standard DoD logistics infrastructure *or by a widely supported commercial infrastructure*. No new support facilities, test equipment, or repair equipment should be developed for this system.

(1) Manpower and Personnel. The JTR will be general purpose user (GPU) system and will not require new military operational specialties or additional skill qualifiers. It should be less manpower and man-hour intensive than current systems.

(2) Training. Development of a program of instruction, new equipment training, technical documentation., extension training materials, training literature, publications and other training products will be accomplished before unit fielding and testing of the system.

d. Standardization and Interoperability. The JTR must comply with applicable information technology standards mandated by the Joint Technical Architecture. All C4I resources will be certified for end-to-end interoperability by complying with the intent of CJCSI 6212.01A, 30 Jun 95.

e. Security. The JTR shall have adequate security safeguards to ensure the confidentiality, integrity, and availability of the information passing through or residing on the communication system. Security features of the JTR will comply with the Multi-level Information Systems Security Initiative (MISSI) and will be integrated into the radio.

f. Spectrum Management. The frequency range of the JTR must be flexible enough to adapt to changes in military frequency spectrum allocations and modes of operation and be capable of being used in civilians bands as well as with coalition forces, both in CONUS and overseas.

g. Network Management. The JTR will be designed to operate as an RF extension for tactical and strategic Wide-Area Networks (WANS), and will not require military-unique or proprietary communications or control interfaces and protocols.

h. Modularity. The JTR will be scaleable to suit the operational and environmental requirements of the specific user (i.e., man-pack systems may be required to have network management integral with the Radio Frequency (RF) functions, shipboard systems will probably not need this capability "built-in,").

6. Joint Potential Designator. The recommended designation is Joint.